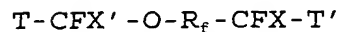


CLAIMS

1. A process for the preparation of perfluoropolyethers of

formula:



(I)

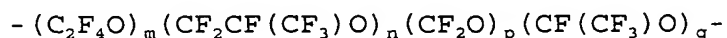
wherein:

T is -F, C₁-C₃ perfluoroalkyl, -CH₂OH, -CH₂NH₂, -CHO;

T' = T with the proviso that when T is F or C₁-C₃ perfluoroalkyl, T' is -CH₂OH, -CH₂NH₂, -CHO;

X, X', equal to or different from each other, are -F or -CF₃;

R_f is selected from:



wherein the sum n+m+p+q ranges from 2 to 200,

the (p+q)/(m+n+p+q) ratio is lower than or equal to

10:100, preferably comprised between 0.5:100 and 4:100,

the n/m ratio ranges from 0.2 to 6, preferably from 0.5

to 3; m, n, p, q are equal to or different from each

other and when m, n range from 1 to 100, preferably from

1 to 80, then p, q range from 0 to 80, preferably from 0

to 50; the units with n, m, p, q indexes being

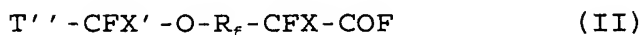
statistically distributed along the chain;

-(CF₂CF₂CF₂O)_r- wherein r ranges from 2 to 200,

-(CF(CF₃)CF₂O)_s- wherein s ranges from 2 to 200,

comprising the following steps:

- A) preparation of perfluoropolyethers of formula



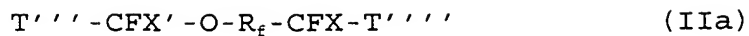
wherein T'' is $-COF$, $-F$, C_1-C_3 perfluoroalkyl, X , X' , R_f are as above, by reduction of the corresponding perfluoropolyethers containing peroxidic bonds, with gaseous hydrogen in the presence of a catalyst formed by metals of the VIII group supported on metal fluorides, at a temperature from $20^\circ C$ to $140^\circ C$, and at a pressure between 1 and 50 atm;

- B) treatment of the formula (II) compounds with inorganic chlorides, preferably $CaCl_2$, by heating at a temperature in the range $100^\circ-150^\circ C$ obtaining perfluoropolyethers having acylchloride $-COCl$ end groups;

- B') treatment of the formula (II) acylfluoride or of the corresponding ester or of the corresponding acylchloride with gaseous ammonia, obtaining the corresponding amide, subsequently dehydrated preferably with P_2O_5 , at a temperature in the range $150^\circ-200^\circ C$, preferably at $170^\circ C$, with the obtainment of perfluoropolyethers with nitrile $-CN$ end groups;

- C) reduction of the perfluoropolyethers with acylchloride end groups, obtained in step B), or with nitrile end groups, obtained in step B'), of formula

(IIa):



wherein:

$T''' = -F, C_1-C_3 \text{ perfluoroalkyl}, -CN, -COCl,$

$T'''' = T'''$ with the proviso that when T''' is $-F$ or

$C_1-C_3 \text{ perfluoroalkyl}, T''''$ is $-CN, -COCl,$

with gaseous hydrogen in the presence of a catalyst constituted by metals of the VIII group selected from Pd, Rh, Ru, supported on solid metal fluorides, at a temperature from 20°C to 150°C, preferably from 80°C to 120°C and at a pressure between 1 and 50 atm, preferably between 1 and 10 atm, optionally in the presence of inert solvents.

2. A process according to claim 1, wherein R_f is selected from the following structures:
 $-(CF_2CF_2O)_m-(CF_2O)_p-$,
 $-(CF_2CF(CF_3)O)_n-(CF_2O)_p-(CF(CF_3)O)_q$.
3. A process according to claims 1-2, wherein the metal fluoride of step C) is selected from the group formed by $CaF_2, BaF_2, MgF_2, AlF_3$, preferably CaF_2 .
4. A process according to claims 1-3, wherein the concentration of the VIII group metal on the metal fluoride of the catalyst of step C) is comprised between 0.1% and 10% with respect to the total weight of the catalyst, prefe-

rably between 1% and 2% by weight.